CLAIMS

What is claimed is:

5 1. An irregular three-dimensional polygonal model of a three-dimensional irregular volume within a GIS platform wherein said model is associated with attribute data of said volume and provides GIS functionality.

10 2. The model of Claim 1 wherein said model is a solid irregular three-dimensional polygonal model,

3. The model of Claim 1 wherein said model is a wire-framed three-dimensional polygonal model.

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4. The model of Claim 1 wherein said GIS functionality includes GIS spatial analytic techniques.

5. The model of Claim 1 wherein said GIS functionality includes GIS
20 querying techniques.

6. The model of Claim 1 wherein exact locations of said volume boundaries are not specified.

25 7. The model of Claim 1 wherein said model is associated with attribute data by joining said model with a table of attributes.

8. The model of Claim 1 constructed by the method comprising:
(a) estimating at least one two-dimensional polygon representing a
30   lateral boundary of said three-dimensional irregular volume;
(b) estimating irregular surfaces representing vertical boundaries of said three-dimensional irregular volume;

43

    (c) clipping said estimated irregular surfaces with said estimated at least one two-dimensional polygon;

    (d) constructing multipatches of a network of triangular panels representing the irregular surfaces and sides of said three-dimensional irregular volume to produce said solid three-dimensional irregular volume model within said GIS platform; and

    (e) joining attributes of said volume to said solid three-dimensional irregular volume model within said GIS platform.

9.   The model of Claim 1 constructed by the method comprising:

    (a) estimating at least one two-dimensional polygon representing a lateral boundary of said three-dimensional irregular volume;

    (b) estimating irregular surfaces representing vertical boundaries of said three-dimensional irregular volume;

    (c) clipping said estimated irregular surfaces with said estimated at least one two-dimensional polygon;

    (d) constructing a grid of regularly spaced polylineZs representing the irregular surfaces and sides of said three-dimensional irregular volume to produce a wire frame three-dimensional irregular volume model within said GIS platform; and

    (e) joining attributes of said volume to said wire frame three-dimensional irregular volume model within said GIS platform.

10.   The model of Claim 1 wherein said model is used within said GIS platform to represent an object selected from the group consisting of: an oil reservoir, a gas reservoir, concentration of a specific compound in a specific geographical area, an aquifer, quality of a specific volume of air over a geographical area, quality of a specific volume of water over a geographical area, and a combination thereof.

11.   A three-dimensional polygonal model of an oil and gas reservoir within a GIS platform constructed by a method comprising:

(a) estimating at least one two-dimensional polygon representing a lateral boundary of said reservoir;

(b) estimating irregular surfaces representing vertical boundaries of said reservoir;

(c) clipping said estimated irregular surfaces with said estimated at least one two-dimensional polygon;

(d) constructing a grid of regularly spaced polylineZs representing the irregular surfaces and sides of said reservoir to produce a wire frame three dimensional polygonal model of said reservoir within said GIS platform; and

(e) joining attributes to said model within said GIS platform.

12.   A three-dimensional polygonal model of an oil and gas reservoir within a GIS platform constructed by a method comprising:

(a) estimating at least one two-dimensional polygon representing a lateral boundary of said reservoir;

(b) estimating irregular surfaces representing vertical boundaries of said reservoir;

(c) clipping said estimated irregular surfaces with said estimated at least one two-dimensional polygon;

(d) constructing multipatches of a network of triangular panels representing the irregular surfaces and sides of said reservoir to produce a solid three-dimensional polygonal model of said reservoir within said GIS platform; and

(e) joining attributes to said model within said GIS platform.

13.   A method for constructing a model comprising:

45

(a) constructing an irregular three-dimensional polygonal model of a three-dimensional irregular volume within a GIS platform; and

(b) joining attributes of said volume to said model within said GIS platform, wherein said model provides GIS functionality.

14. The method of claim 13 wherein said model is selected from the group consisting of a wire-framed three-dimensional polygonal model, a solid three-dimensional polygonal model and a combination thereof.

15. The method of claim 13 wherein said GIS functionality includes GIS spatial analytic techniques.

16. The method of claim 13 wherein said GIS functionality includes GIS querying techniques.

17. A method for constructing a three-dimensional polygonal model of an oil and gas reservoir comprising:

(a) constructing an irregular three-dimensional polygonal model of said reservoir within a GIS platform; and

(b) joining attributes of said reservoir to said model within said GIS platform, wherein said model provides GIS functionality.

18. The method of 17 wherein said model is selected from the group consisting of a wire-framed three-dimensional polygonal model, a solid three-dimensional polygonal model and a combination thereof.

19. The method of claim 17 wherein said GIS functionality includes GIS spatial analytic techniques.

20. The method of claim 13 wherein said GIS functionality includes GIS querying techniques.